REMARKS

Claims 1 to 20 are pending in the application; claims 16 to 20 are withdrawn.

Priority Document

A verified translation of the priority document is submitted herewith in order to perfect the priority date of September 9, 2002, in view of the cited reference *Knoblauch et al. (Nature Materials 2003)*, published 24 August 2003. The cited reference therefore has a publication date after the perfected priority date and is not a relevant reference.

Claim Rejections - 35 U.S.C. 101

The claims 1 to 15 stand rejected under 35 USC 101 as being directed to non-statutory subject matter. The examiner points out that the language of the claims as presented does not distinguish the claimed subject matter form that which is naturally occurring. Examiner proposed the claims should be amended to indicate the hand of the inventor by using e.g. "isolated". Claim 1 has been amended accordingly.

Reconsideration and withdrawal of the rejection of the claims under 35 USC 101 are respectfully requested.

Claim Rejections - 35 U.S.C. 112

Claims 1-15 stand rejected under 35 U.S.C. 112, 2nd paragraph, as being indefinite.

The examiner has objected to the term "derivable" in claim 1 and this term has been deleted and replaced with "isolated".

Claims 8-11 and claims 13 and 15 stand rejected because of the confusing language "comprising or consisting of"; the phrase "consisting of" has been deleted.

Reconsideration and withdrawal of the rejection of the claims under 35 USC 112 are respectfully requested.

Rejection under 35 U.S.C. 102

Claims 1-7 stand rejected under 35 U.S.C. 102(a) as being anticipated by *Knoblauch et al. (2003, Nature Materials)*. The instant application has a priority date of

September 9, 2002, so that cited reference is not applicable.

Claims 1-7 stand rejected under 35 U.S.C. 102(b) as being anticipated by *Knoblauch (2001 The Plant Cell)*.

The examiner argues that the reference discloses crystalline P-proteins that are found in sieve elements of Fabaceae (p. 1222) that appear as elongate electron-dense bodies up to 30 µm long and 2 to 6 µm thick (p 1222, Fig. 1A). The examiner further states that the reference does not disclose all the elements cited in the claims but that these elements are believed to be present in the forisomes of *Knoblauch et al.* when subjected to the Ca2+ treatment or the pH environment since the claimed forisomes and the forisomes of *Knoblauch et al. (2001 The Plant Cell)* are both derivable from Fabaceae and have a length of 1 to 40 µm and a diameter of appr. 1 to 10 µm. Examiner argues in regard to claims 3 and 6 that given that the properties of the forisomes are disclosed in *Knoblauch et al. (2001 The Plant Cell)*, the claimed peptides should be present also.

The claim 1 now claims "isolated forisomes" and such isolated forisomes are not disclosed and anticipated by *Knoblauch et al. (2001 The Plant Cell); Knoblauch et al. (2001 The Plant Cell)* states under the heading "Results" in the second paragraph that:

"Our attempts to isolate individual crystalloids failed because crystalloids vanished within a few seconds when the surrounding cell wall was damaged mechanically."

The "Plant Cell" reference is a publication by the inventors of the present application and concerns the behavior of forisomes *in situ*, i.e., in the living plant environment in the phloem of the plants (see first paragraph under "Crystalloids Visible in Intact SEs" under the heading "Results"). Observations under the transmission electron microscope showed that in the living SEs (sieve elements) the intact protein bodies have a length of approximately 30 micrometers and a width of 2-6 micrometers as shown in Fig. 1A. By means of dye it was possible to show that vanishing of the protein bodies coincided with a transformation of the dense elongate crystalloid structure to a less dense round plug structure. These conformational changes were

caused by a prick with a micropipette (see explanations in the second paragraph under the heading "Plasma Membrane Leakage Induces Crystalloid Dispersal" of *Plant Cell*). Moreover, it was found that calcium ions can induce the conformational changes of the forisomes. However, at the time of filing the German priority application of the present U.S. application it was not possible, as evidenced by *Knoblauch et al. (2001 The Plant Cell)*, to isolate intact protein bodies from the phloem of the plant cells (in which their native behavior had been observed to a certain degree) in order to observe their behavior in an artificial environment.

As already explained in the second paragraph under the heading "Summary of the Invention" of the present specification, it is possible to push individual protein bodies manually out of the cell and to transfer them onto a microscope slide. However, when this is done, the protein bodies are destroyed in an uncontrollable manner so that the obtained clumps of a more or less amorphous state exhibit only minimal reactivity expressed in apparent volume changes as a reaction to changes of the calcium concentrations in the medium. The inventors of the present invention were able to obtain and isolate forisomes from such plants and observe them in intact form only after many unsuccessful experiments and preliminary trials.

The destruction of the forisomes observed prior to the instant invention is the result of having to prick the forisomes centrally for their isolation (pushing them onto slides). The damage that results from this treatment was such that the features and behavior now claimed in the instant claims could not be observed for the forisomes removed from their natural environment. These features, now claimed are:

- the forisomes exhibit a **contraction in the direction of the longitudinal axis** in the context of the reversible, anisotropic contractability for an increase of the surrounding calcium ion concentration past a threshold value of appr. 30 nmol;

- the forisomes exhibit the capability of **becoming thicker in the direction perpendicular to the longitudinal axis without becoming shorter** in the direction of the longitudinal axis when increasing a surrounding pH value to a value above appr. 9.5, and vice versa.

The inventors have thus for the first time isolated forisomes from their natural environment: the prior isolation attempts provided a product that significantly differs physically and thus with regard to their chemical reactions from the presently claimed forisomes. In this context, it is apparent that the isolated bodies and the properties being claimed are not anticipated by *Knoblauch et al. (2001 The Plant Cell)* - the state of the art prior to the instant application: whether or not these are inherent features, the prior art does not teach isolated protein bodies with such features. The cited publication *The Plant Cell 2001* therefore cannot anticipate the subject matter as claimed in the instant application.

Also, the importance of the claimed features is apparent when looking at the examples 6 and 7 of the instant application: the capability of becoming thicker in the direction perpendicular to the longitudinal axis without becoming shorter in the direction of the longitudinal axis when the pH value increases above appr. 9.5 enables the use of the forisomes as microswitches etc. and the contraction in the direction of the longitudinal axis in the context of the reversible, anisotropic contractability for an increase of the surrounding Ca ion concentration past a threshold value of appr. 30 nmol enables the use of the forisomes as micro tweezers or as a sensor for Ca ion concentration changes.

Claim 1 and its dependent claims are therefore not anticipated and not obvious in view of the cited reference to *Knoblauch et al. (2001 The Plant Cell).*

Reconsideration and withdrawal of the rejection of the claims under 35 USC 102 are therefore respectfully requested.

CONCLUSION

In view of the foregoing, it is submitted that this application is now in condition for allowance and such allowance is respectfully solicited.

Should the Examiner have any further objections or suggestions, the undersigned would appreciate a phone call or **e-mail** from the examiner to discuss appropriate amendments to place the application into condition for allowance.

Authorization is herewith given to charge any fees or any shortages in any fees required during prosecution of this application and not paid by other means to Patent

and Trademark Office deposit account 50-1199.

Respectfully submitted on August 2, 2009,

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